<u>We Claim</u>:

1. A system for applying ultrasound energy to the thoracic cavity of an individual comprising

an ultrasound applicator sized to be placed in acoustic contact with the individual to transcutaneously apply ultrasound energy to the thoracic cavity, and

an electrical signal generating machine adapted to be coupled to the ultrasound applicator, the electrical signal generating machine including a controller to generate electrical signals to operate the ultrasound applicator during a treatment session to produce ultrasound energy in pulses at a prescribed pulse repetition frequency (PRF), a prescribed fundamental therapeutic frequency laying within a range of fundamental therapeutic frequencies not exceeding about 500 kHz, and at a duty cycle (DC) of about 50% or less, wherein DC = PD divided by 1/PRF, where PD is the amount of time for one pulse.

2. A system according to claim 1

wherein the duty cycle (DC) lays between about 10% to about 25%.

3. A system according to claim 1

wherein the ultrasound applicator includes an ultrasonic coupling region being sized to transcutaneously apply ultrasound energy in a diverging beam that substantially covers an entire heart.

4. A system according to claim 1

wherein the ultrasonic applicator includes a transducer and an ultrasonic coupling region to transcutaneously apply ultrasound energy at the prescribed fundamental therapeutic frequency, the transducer having an effective diameter (D) and an aperture size (AP) not greater than about 5 wavelengths, wherein AP is expressed as AP = D/WL, where WL is the wavelength of the fundamental frequency.

5. A system according to claim 1

further including an assembly worn on the thorax and adapted to be affixed to the ultrasound applicator, to stabilize placement of the ultrasound applicator on the thorax during transcutaneous application of ultrasound energy.

6. A system according to claim 1

wherein the range of fundamental therapeutic frequencies is between about 20 kHz and about 100kHz.

7. A system according to claim 6

wherein the prescribed fundamental therapeutic frequency is about 27 kHz.

8. A system according to claim 1

wherein the ultrasound applicator includes an ultrasound transducer to transcutaneously apply ultrasound energy to the thoracic cavity, the ultrasound transducer being sized to provide an intensity not exceeding 3 watts/cm^2 at a maximum total power output of no greater than 150 watts operating at the prescribed fundamental therapeutic frequency.

9. A system according to claim 8

wherein the range of fundamental therapeutic frequencies is between about 20 kHz and about 100kHz.

10. A system according to claim 9

wherein the prescribed fundamental therapeutic frequency is about 27 kHz.

11. A system according to claim 1

wherein the ultrasound applicator includes a housing carrying an ultrasound transducer, the housing including a chamber to hold an acoustic coupling media about the ultrasound transducer.

12. A system according to claim 11

wherein the acoustic coupling media comprises water, or ultrasonic gel, or oil, or a polymer, or a combination thereof.

13. A system according to claim 11

wherein the housing accommodates circulation of media in the chamber about the ultrasound transducer.

14. A system according to claim 1

wherein the ultrasonic applicator includes an ultrasonic coupling region adapted, in use, to contact skin, the ultrasonic coupling region including a flexible material that forms a contour-conforming interface with skin.

15. A system according to claim 1

wherein the ultrasound applicator includes a housing carrying an ultrasound transducer, the housing including a skirt that enables spacing the ultrasound transducer from contact with skin.

16. A system according to claim 15

wherein the ultrasound applicator includes an ultrasonic coupling region adapted, in use, to contact skin.

17. A system according to claim 16

wherein the ultrasonic coupling region includes a flexible material that forms a contour-conforming interface with skin.

18. A method for applying ultrasound energy to the thoracic cavity of an individual comprising the steps of

placing an ultrasound applicator in acoustic contact with the individual to transcutaneously apply ultrasound energy to the thoracic cavity, and

generating electrical signals to operate the ultrasound applicator during a treatment session to produce ultrasound energy in pulses at a prescribed pulse repetition frequency (PRF), a prescribed fundamental therapeutic frequency laying within a range of fundamental therapeutic frequencies not exceeding about 500 kHz, and at a duty cycle (DC) of about 50% or less, wherein DC = PD divided by 1/PRF, where PD is the amount of time for one pulse.

19. A method according to claim 18

wherein the duty cycle (DC) lays between about 10% to about 25%.

20. A method according to claim 18 further including the step of transcutaneously applying the ultrasound energy pulses in a diverging beam that substantially covers an entire heart.

21. A method according to claim 18 further including the step of applying the ultrasound energy pulses through an ultrasonic coupling region using a transducer having an effective diameter (D) to transcutaneously apply the ultrasound energy pulses at the prescribed fundamental therapeutic frequency in a diverging beam having an aperture size (AP) not greater than about 5 wavelengths, wherein AP is expressed as AP = D/WL, where WL is the wavelength of the fundamental frequency.

22. A method according to claim 18 further including the step of stabilizing placement of the ultrasound applicator on the thorax during transcutaneous application of ultrasound energy.

23. A method according to claim 18 wherein the range of fundamental therapeutic frequencies is between about 20 kHz and about 100kHz.

24. A method according to claim 23 wherein the prescribed fundamental therapeutic frequency is about 27 kHz.

25. A method according to claim 18 wherein the ultrasound applicator is operated to provide an intensity not exceeding 3 watts/cm^2 at a maximum total power output of no greater than 150 watts operating at the prescribed fundamental therapeutic frequency.

26. A method according to claim 25 wherein the range of fundamental therapeutic frequencies is between about 20 kHz and about 100kHz.

27. A method according to claim 26 wherein the prescribed fundamental therapeutic frequency is about 27 kHz.